USDA

United States Department of Agriculture

Malheur National Forest

Forest-wide Travel Analysis

Steven K Beverly

Forest Supervisor

9/23/15

Date

For more information, contact:
Malheur National Forest
431 Patterson Bridge Rd.
John Day, OR 97845
541-575-3000

Forest Service **Malheur National Forest** **Oregon** **September 2015**

Contents

List of Tables

List of figures

Executive Summary

The Malheur National Forest completed a Forest-wide roads analysis process in April 2005. This process provided useful information, including identifying the recommended minimum, primary open-road system, which comprised 22 percent of existing National Forest System (NFS) roads at the time.

The Washington Office now requires that all units within the National Forest System complete a travel analysis process by the end of Fiscal Year 2015. This travel analysis reviews and analyzes the lower standard system roads not identified as the primary open-road system. It also incorporates recent NEPA decisions involving the transportation system and deemed current by the Forest Supervisor. There are 5,219 miles of road that were not part of the primary open-road system or recent NEPA decisions that require an evaluation under this travel analysis. This includes 2,406 miles of Maintenance Level 1 roads and 2,813 miles of Maintenance Level 2 roads.

This travel analysis involves National Forest System roads located within the Malheur National Forest (approximately 1.46 million acres), as well as Ochoco National Forest lands administered by the Malheur (approximately 0.24 million acres).

The key issues for this travel analysis include:

Effects to:

- off-road motorized travel
- motorized access for dispersed camping
- inventoried road-less areas, riparian areas, old growth, research natural areas and wild and scenic rivers from motorized access for dispersed camping

Impacts to:

- motorized game retrieval
- permitted actions
- access for people with disabilities and older Americans

Effects on:

- recreational opportunities
- water quality/fish habitat
- threatened, endangered and sensitive species
- other important species
- watershed and soils
- invasive plant species and noxious weeds
- socio/economics
- wilderness areas, potential wilderness areas, inventoried roadless areas, research natural areas, wild and scenic rivers and areas of undeveloped character

An interdisciplinary team was assigned to represent key resource areas to address these issues and provide resource evaluations to determine risks and benefits to the existing road network. Roads were "scored" by each specialist with values of 1 through 5 for both risks and benefits. Risks and benefits were then summed into a total risk and benefit rating.

Preliminary opportunity matrices were developed to combine the risks and benefits into opportunities for change. Two matrices were developed, one for Operational Maintenance Level 1 roads and one for Operational Maintenance Level 2 roads.

A total of 2,119 roads received a high benefit or high risk. These high-priority roads totaled 2,166 miles. A total of 5,362 roads involving 2,948 miles were categorized as a medium priority. Low priority roads included 287 roads with a total of 82 miles. Table 35 provides a recommendation for the priority and for future management and potential engineering options.

A map and a table including all road results are included in the appendices.

Step 1: Setting up the Analysis

Purpose

The purpose of this section is to:

- Identify the project area and state objectives
- Clarify the roles of technical specialists
- Develop a process plan and an analysis plan
- Address information needs

Project Introduction

The Washington Office requires that all units within the National Forest System (NFS) complete a travel analysis process by the end of Fiscal Year 2015. At a minimum, all NFS roads must be included. This analysis is considered a "left-side" process on the NEPA triangle, and is designed to be used to inform NEPA decisions involving travel management.

The Malheur National Forest completed a Forest-wide roads analysis process in April 2005. This process provided useful information, including identifying the recommended minimum, primary open-road system, which comprised 23 percent of existing NFS roads at the time. This travel analysis process builds and expands on the 2005 roads analysis process to determine a long-term management opportunity for all NFS roads managed by the Malheur National Forest. This travel analysis also incorporates recent NEPA decisions involving the transportation system and deemed current by the Forest Supervisor.

There are 5,220 miles of road that were not part of the primary open-road system or recent NEPA decisions that require an evaluation under the travel analysis process. This includes 2,406 miles of Maintenance Level 1 roads and 2,813 miles of Maintenance Level 2 roads. This analysis involves NFS roads located within the Malheur National Forest (approximately 1.46 million acres), as well as Ochoco National Forest lands administered by the Malheur (approximately 0.24 million acres).

Terrain encompassed by the analysis area is quite varied in respect to slope, aspect, and elevation. All aspects are represented as the landscape is composed of numerous hills, valleys, and ridges that vary in size.

Future NEPA projects may include combinations of vegetation management treatments, including commercial thinning, prescribed burning and both mechanized and nonmechanized treatments that will restore desired forest conditions, improve watershed health, enhance fisheries and aquatic species habitat, and reduce hazardous fuels. Additional NEPA projects may include transportation access to mining activities, access to developed recreation sites and dispersed recreation sites and areas, access to authorized users of special use permits including easements. Projects may also include transportation access to national forest improvements including user-constructed facilities, designated areas, designated resource areas, and special use areas. Future NEPA projects may include tribal access to traditional and cultural property and resources. The forest-wide travel analysis will assist Malheur National Forest line officers to develop proposed actions involving NFS roads, and provide resource information concerning risks and benefits associated with roads.

Project Area and Objectives

The analysis area for this travel analysis encompasses NFS lands administered by the Malheur National Forest (1.7 million acres; see map in Appendix B). The travel analysis process will be

conducted primarily for Maintenance Level 1 and 2 roads not recently analyzed under NEPA or addressed in the roads analysis process for the Malheur National Forest. The objective of the analysis is to develop opportunities and identify high priority opportunities for change, based on scientific assessments of applicable resource risks and benefits.

The travel analysis process is intended to be a broad-scale comprehensive look at the transportation network. The main objectives of the travel analysis are to make recommendations that:

- Balance the benefit of access while minimizing risks by analyzing important ecological, social, and economic issues related to roads
- Develop maps, tables, and narratives that display transportation management opportunities and strategies that address current and future access needs, and environmental concerns
- Identify opportunities for changes by evaluating risks
- Identify opportunities for future proposed actions
- Inform travel management decisions for future NEPA documents

The final travel analysis report is not a decision document; it identifies opportunities and priorities. Approximately 22 percent of the open system roads have recommendations provided under the 2005 Malheur National Forest roads analysis process. The travel analysis was done in an interdisciplinary manner that included resource specialist evaluation and input for roads.

Roles of Specialists

An interdisciplinary team comprised of Malheur National Forest specialists was assigned to the travel analysis process. The team members and their primary analysis role are listed in Table 1 (next page).

Process Plan

This travel analysis process follows the same six-step process outlined in the roads analysis process, as described in Forest Service Handbook 7709.55, chapter 20 (USDA Forest Service 2009). This was originally presented in FS-643, "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System" (USDA Forest Service 1999).

Table 1. The travel analysis interdisciplinary team

Resource	Name
Aquatic Biology	Steven Namitz
Wildlife Biology	Clark Reames
Fire and Fuels	Todd Gregory
Vegetation, Timber, Silviculture, Forest Health & Protection	Larry Amell
Minerals, Geology, Lands, Special Uses & Utilities	Stacia Kimbell
Engineering, Rights of Way & Authorized Uses	John Laliberte
Range	Ernie Gipson
Recreation, Special Areas, Scenery & Visuals	Bruce Andersen
Watershed, Hydrology, Soils	Tom Friedrichsen
Heritage Resources, Archaeology, Traditional Cultural Uses, Tribal Benefits & Concerns	Don Hann
Special & Sensitive Plants, Botany, Weeds	Whitney Rapp
Geographic Information Systems	Jonna DuShey
Law Enforcement	Aaron Heinrichs*
Safety	Lisa Rynearson*
Public Affairs, Social Issues	Shilo Burton*
Writer/Editor (TEAMS)	Judy York
Team Leader (TEAMS)	Chris Bielecki

*Extended team members

Scheduling

The interdisciplinary team followed the schedule shown in Table 2, in accordance with the Malheur Leadership Team discussion and agreement:

Table 2. Interdisciplinary team scheduling

Date	Objective
October 2014	IDT Leader prepares a ticket for GIS identifying GIS hours and request for DRM services to compete mapping for Subpart A.
Early November 2014	IDT Leader meeting with Forest Supervisor and RELM Staff Officer to discuss expectations, identify applicable issues, identify necessary IDT specialists to address those issues, review decision matrix/potential outcomes, and desired timelines. IDT Leader meets with GIS specialist to assemble current situation data ("snapshot") and discuss packaging for IDT
December 2014	FLT approval of IDT assignments, schedule; issuance of PIL
January 15, 2015	Project Initiation Letter issued to IDT members; travel analysis references assigned for review prior to kickoff meeting
February 4, 2015	IDT kickoff meeting in John Day
February/March 2015	Individual resource evaluations; virtual discussions & meetings as necessary
April 2015	Compile resource input; develop preliminary route opportunities based on decision matrix.
May 2015	IDT & line review preliminary recommendations and identify concerns
June 8, 2015	IDT meeting to discuss adjustments and finalize opportunities
June 30, 2015	Complete draft report
July 2015	Forest & Regional review; comments and edits incorporated; Final Travel Analysis Report presented to Forest Supervisor

Step 2: Describing the Situation

Purpose

The purpose of this step is to:

- Describe the existing road system
- Describe the existing direction
- Describe road maintenance levels

Existing Road System

Currently, the Malheur National Forest has an extensive road system totaling 9,642 miles. It is comprised of Maintenance Level 1 through Maintenance Level 4 roads. The table of roads in Appendix A displays roads identified in the roads analysis as the primary open road system, as well as roads analyzed under recent NEPA decisions.

This travel analysis reviews and analyzes the Maintenance Level 1 and Maintenance Level 2 roads and does not analyze the primary open-road system that was developed in the roads analysis process, and it does not analyze roads addressed in recent NEPA decisions.

Existing Direction for Roads, Trails, and Areas

A. General

This travel analysis identifies opportunities for change to the Malheur National Forest transportation system. It incorporates existing direction from laws and regulations, official directives, forest plans, forest orders, and forest-wide or project-specific roads decisions. Information about the managed system is documented in the INFRA road database, road management objectives, and maps.

B. Roads

Open Roads

Existing NFS roads open to the public for motorized use are currently in the Forest INFRA database (an Oracle database containing information on all roads and improvements on National Forest System lands) with the following attributes:

- System = National Forest System Road
- Jurisdiction = Forest Service
- Route Status = Existing
- Operational Maintenance Level = 2-5

Closed Roads

Closed roads have been, or will be, closed to vehicle traffic but are necessary for future activities. They appear in the Forest INFRA database under the following categories:

- System = National Forest System Road
- Jurisdiction = Forest Service
- Route Status = Existing
- Operational Maintenance Level = 1

Decommissioned Roads

Decommissioned roads are no longer part of the inventoried road system and have no intended use as a road for the future. They are typically overgrown, and have had some type of physical procedure that prevents driving the road, such as ripping or having boulders placed in the decommissioned surface. They appear in the Forest INFRA database under the following categories:

- System = National Forest System Road
- Jurisdiction = Forest Service
- Route Status = Decommissioned
- Operational Maintenance Level = 1-5 (captures the previous condition prior to decommissioning)

To return a decommissioned road to service as a National Forest System road, the NEPA process must be followed to add the road mileage to the current inventory and allow motorized traffic back on the road, even when no physical work is required.

Unauthorized Roads

An unauthorized road is a road that exists on the national forest, but is not included in the Forest INFRA database. These roads are usually established by various users over time. They were not planned, designed, or constructed by the Forest Service. Currently, these roads are not in the Forest INFRA database, nor are they part of the NFS roads. This travel analysis does not include unauthorized routes; however, they may be included for management action in future NEPA processes when identified.

C. Previous Travel Management Analyses and Decisions

The "Malheur National Forest Roads Analysis Process," published in April 2005, is used as information by the Malheur National Forest line officers to help understand the Forest transportation system. This roads analysis process identified roads which would remain open and are identified as the primary open-road system.

In addition to the roads analysis process, the following NEPA decisions were carried forward as current, and the roads were not reanalyzed in this travel analysis (Table 3). Roads identified for decommissioning in these documents were identified in the "Roads Needed and Not Needed" map, in Appendix C.

Table 3. NEPA projects with roads not analyzed for this travel analysis

Project Name	FY Signed
Wolf	2015
Elk 16	2015
Big Mosquito	2015
Upper Pine	2013
Galena	2013
Marshall Devine	2012
Soda Bear	2012
Starr	2012
Dairy	2012
Jane	2010

Project Name	FY Signed
Damon	2010
Green Ant	2010
Knox	2009
Dads	2009
Camp Creek RA	2008
Balance	2008
Egley	2008
Thorn	2008
Crawford	2008
Canyon Creek WUI	2006

Road Maintenance Levels

The Forest Service differentiates NFS roads into five maintenance levels, which define the level of service, and maintenance required.

- **Road Maintenance Level 5 (ML5)** – roads are managed and maintained for a high degree of user comfort. These roads are generally high standard, double lane paved roads and are suitable for passenger vehicles. There are no ML5 roads on the Malheur National Forest.
- **Road Maintenance Level 4 (ML 4)** – roads are managed and maintained for a moderate degree of user comfort. These roads are generally low standard paved roads or double lane aggregate surfaced roads and are suitable for passenger vehicles.
- **Road Maintenance Level 3 (ML3)** – roads are managed and maintained for a moderate degree of user comfort. These roads are generally aggregate surface roads and are suitable for passenger vehicles.
- **Road Maintenance Level 2 (ML2)** – roads are managed and maintained for use by high-clearance vehicles; passenger car traffic is not a consideration.
- **Road Maintenance Level 1 (ML1)** – roads that are closed to vehicular traffic.

A summary of NFS roads on the Malheur National Forest is provided in the table below:

Table 4. Miles of road by maintenance level on the Malheur National Forest

Objective Maintenance Level	1	2	3	4	5	Total
Admin Total (miles)	3,840	5,374	156	204	0	9,573

Step 3: Identifying Issues

Purposes

The purpose of this step is to identify key issues related to management of existing road system.

Public Involvement

- Extensive scoping from Subpart B that was performed as part of the NEPA analysis. Subpart B is currently on hold.
- Road related meetings with public and County Commissioners in Grant and Harney County Oregon.
- Scoping and public involvement process in project-level NEPA analysis.
- Tribal governments have been updated on travel management at ongoing consultation meetings.

Key Issues

The Forest Supervisor identified relevant key issues using past public involvement. The key issues for this travel analysis include:

Effects to:

- off-road motorized travel
- motorized access for dispersed camping and firewood gathering
- inventoried road-less areas, riparian areas, old growth, research natural areas and wild and scenic rivers from motorized access for dispersed camping

Impacts to:

- motorized game retrieval
- permitted actions
- access for people with disabilities and older Americans

Effects on:

- recreational opportunities
- water quality/fish habitat
- threatened, endangered and sensitive species
- other important species
- watershed and soils
- invasive plant species and noxious weeds
- socio and economics
- wilderness areas, potential wilderness areas, inventoried roadless areas, research natural areas, wild and scenic rivers and areas of undeveloped character
- traditional uses

Step 4: Assessing Benefits, Problems and Risks

Purposes

The purposes of Step 4 are to:

- Describe the analysis process
- Describe the criteria used in the risk and benefit analysis process
- Describe the scoring and rating
- Summarize the risk and benefit of existing motorized routes
- Discuss the statistical distribution of risk and benefit assessment

The Analysis Process

The issues described in Step 3 were addressed by the interdisciplinary team in the following assessments. The risk and benefit criteria categories (were developed by considering the issues from Step 3 and the suggested resource questions for roads analysis described in FS-643 "Roads Analysis: Informing Decisions about Managing the National Forest Transportation System" (roads analysis process). The interdisciplinary team reviewed these resource questions and used them to develop criteria to use in ranking the risks and benefits of each road. Each road was then evaluated against the identified risks and benefits.

Criteria Used in the Risk and Benefit Analysis Process

Roads on the Malheur National Forest provide access benefits for many uses. They also provide the infrastructure to facilitate motorized recreation, range management, vegetation management and other multiple uses of the national forest. However, the presence of roads may also cause negative effects or risks on the natural and cultural resources of the Malheur.

The road risk/benefit issues, which were identified by the Forest Supervisor, were assigned to individual specialists based on the resource area affected. The specialist was tasked to produce a succinct statement for each issue describing the issue, and the criteria by which they would rank the impact of each road or trail for that issue. The following table details the issue and ranking statements and evaluation criteria to be used for the Malheur National Forest travel analysis process.

Roads were scored with values of 1 through 5 for both risks and benefits. Each resource specialist was asked to develop criteria for characterizing values for roads based on impacts to their resource area. The following tables detail these criteria.

Malheur National Forest Aquatic Species and Associated Habitats

Table 5. Individual risk rating for threatened, endangered and sensitive aquatic species

Individual Risk Rating: Road impact on Threatened, Endangered and Sensitive Aquatic Species	
Location of the road segment in relation to aquatic threatened, endangered or sensitive species.	**VERY HIGH (5pts) –** Road passes through a riparian habitat conservation area (RHCA) with federally listed species Or The road has 3 or more stream crossings within designated critical habitat for MCRS or Columbia River bull trout.
	HIGH (4pts) – Road passes through an RHCA with sensitive species Or The road has 2 or more stream crossings within designated critical habitat for MCRS or Columbia River bull trout.
	MODERATE (3pts) – Road passes through a watershed (outside the RHCA) with federally listed species. Or The road has 1 or more stream crossings within designated critical habitat for MCRS or Columbia River bull trout.
	LOW (2pts) – Road passes through a watershed (outside the RHCA) with sensitive species
	VERY LOW (1pts) – Road segment is within a watershed that has no threatened, endangered or sensitive species

*Points = Risk Rating (1 – 5)

Table 6. Risk Rating for aquatic species

Risk Rating: Road Impacts on Aquatic Species and Aquatic Strongholds	
Overall aquatic risk rating from the 2005 Malheur National Forest Roads Analysis The following was a list of species considered to be present or absent within each sub-watershed: • Spring Chinook salmon • Steelhead trout. • Bull trout. • Cutthroat trout. • Redband trout. If the road segment was with an aquatic stronghold it was weighted with an additional 3 points. Over all aquatic risk scoring: Very low: 0 points Low: 1-2 points Moderate: 3-4 points High: 5-6 points Very High: 7-8 points	**VERY HIGH (5pts)** – Road segment is within a subwatershed that has 4 to 5 species of concern and is considered to be an aquatic strong hold. Overall score of 7-8 points.
	HIGH (4pts) – Road segment is within a subwatershed that has 2 to 3 species of concern and is considered to be an aquatic strong hold. OR Road segment is within a subwatershed that has 5 species of concern and is not considered to be an aquatic strong hold. Overall score of 5 to 6 points.
	MODERATE (3pts) – Road segment is within a subwatershed that has 1 species of concern and is considered to be an aquatic strong hold. OR Road segment is within a subwatershed that has 3 to 4 species of concern and is not considered to be an aquatic strong hold. Overall score of 3-4 points.
	LOW (2pts) – Road segment is within a subwatershed that has 1 to 2 species of concern and is not considered to be an aquatic strong hold. Overall score of 1-2 points.
	VERY LOW (1pts) – Road segment is within a subwatershed that has no fish. Overall score of 0 points.

*Risk score converted to Risk Ratings of 1 -5 based on qualitative rating (e.g. Very low = 1, Very high = 5)

Threatened, Endangered, and Sensitive Plants

Threatened and endangered plant species have been listed as such under the provisions of the Endangered Species Act of 1973. No listed species are known to occur on the Malheur National Forest.

Sensitive plant species have been formally determined by the Forest Service Pacific Northwest Region as species whose populations require special management to ensure that Forest Service activities do not necessitate the species being listed as threatened or endangered.

Occurrences within 100 feet of a road centerline are subject to the direct impacts of vehicles, road maintenance, and human use. Occurrences within 100 feet and 500 feet of a road centerline are potentially at risk.

Table 7. Risk rating for threatened, endangered or sensitive plants

Risk Rating: Road Impacts on Threatened, Endangered and Sensitive Plants	
Question to be addressed? Where are roads posing a risk to threatened, endangered or sensitive plants? **Units of Measure:** Presence of threatened, endangered or sensitive plants within 500 ft. of road centerlines Documentation of threatened, endangered or sensitive survey effort near road **Data Source:** Element Occurrence Pt - FS_NRIS_SSI.NR_TX_EO_PT Element Occurrence Poly - FS_NRIS_SSI.NR_TX_EO_PL Survey - FS_NRIS_SSI.NR_TX_SURVEY_PL TAP Roads2Analyze	**5 (HIGH)** – Documentation of threatened, endangered, or sensitive plant species within 100 ft. of road centerline. **4 (MOD-HIGH)** - Documentation of threatened, endangered, or sensitive plant species between 100 to 500 ft. of road centerline. **3 (MODERATE)** - No known threatened, endangered, or sensitive plant species within 500 ft. of road centerline and no survey effort has occurred within 500 ft. of road centerline. **2 (LOW-MOD)** – Not used. **1 (LOW)** – No known threatened, endangered, or sensitive plant species within 500 ft. of road centerline and some survey effort has occurred in area.

Invasive Plants

Vehicles travelling along roads and road maintenance activities may spread weeds by picking up invasive plant seeds (or other propagules) from an infested location and later depositing them in uninfested locations. The highest risks are posed by areas with multiple invasive plant species in proximity to the road as weeds are so abundant that picking up seeds is very likely. Moderate to high risks occur when only a singular species is present near the road. Moderate risk occurs when invasive plants are found further from the road centerline. Low to moderate risks occur in areas where no survey effort has been documented. Finally, low risk occurs in areas where survey work has occurred and no invasive plants have been documented.

Vehicles and associated road activities may disperse seeds or propagules from invasive plants within 100 feet of road centerline. Occurrences within 100 feet and 500 feet of a road centerline are potentially at risk.

Table 8. Risk rating for invasive plants

Risk Rating: Road Impacts on Invasive Plants	
Question to be addressed? Where are roads posing a risk to spread invasive plants? **Units of Measure**: Presence of invasive plants within 500 feet of road centerlines Documentation of TES survey effort near road **Data Source:** Invasive Species Inventory-FS_NRIS_SSI.NR_TX_INSP_PL Survey - FS_NRIS_SSI.NR_TX_SURVEY_PL TAP Roads2Analyze	**5 (HIGH)** – Documentation of more than one target invasive plant species within 100 ft. of road centerline.
	4 (MOD-HIGH) - Documentation of one target invasive plant species within 100 ft. of road centerline.
	3 (MODERATE) - Documentation of target invasive plant species between 100 and 500 ft. of road centerline.
	2 (LOW-MOD) – No known target invasive plant species within 500' of road centerline and no survey effort has occurred in area.
	1 (LOW) – No known target invasive plant species within 500 ft. of road centerline and some survey effort has occurred in area.

Heritage Resources

Table 9. Risk rating for heritage resources

Risk Rating: Road Impacts on Heritage Resources	
Question to be addressed? Are historic properties at risk of vandalism or accidental damage due to proximity of an open road? **Units of Measure**: Presence/absence **Data Source:** Malheur National Forest Heritage and roads GIS files	**5 (HIGH)** – Historic property located within 50 feet of an existing road
	1 (LOW) – Historic property located more than 50 feet from an existing road

* Used existing roads – not just open – because the risk is based on the proximity to the road and operational maintenance level does not necessarily mean the road does not incur vehicular traffic.

Water Quality

Table 10. Risk rating for sediment delivery to streams, water quality

Risk: Overall Risk Rating of Potential Sediment Delivery from Roads (The overall risk rating for water quality is identified in the first table below. This overall rating is produced by the combined analysis of individual risk ratings for road impact, potential sediment delivery and slope or road surface.)	
Roads can be a source of elevated sediment to streams and other hydrological features, negatively impacting water quality and fish habitat. Information to determine the overall risk rating of potential sediment delivery from roads is calculated by taking the sum of the individual risk ratings as described below.	**VERY HIGH** – Sum of Individual Risk Ratings >12.5 pts
	HIGH – Sum of Individual Risk Ratings 10-12.5 pts
	MODERATE – Sum of Individual Risk Ratings 7.5-10 pts
	LOW – Sum of Individual Risk Ratings 5-7.5 pts
	VERY LOW – Sum of Individual Risk Ratings <5 pts
Individual Risk Rating: Road Impact on Sediment Delivery by Slope Position (lower 1/3 slope position versus mid-upper slope position)	
Information Needs: Subwatershed (HUC #) Acres of subwatershed Acres of disturbance of road (cutbank, fill slope, road surface) Number of stream crossings Road Impact Index (RII) – [(acres of road disturbance)/ subshed acres)*number of stream crossings] Road segment slope position (lower 1/3 versus mid-upper slope position)	**VERY HIGH (5pts)** – RII >0.4 (Lower Slope Roads)
	HIGH (4pts) – RII >0.8 (Mid to Upper Slope Roads) Or RII = 0.1 - <= 0.4 (Lower Slope Roads)
	MODERATE (3pts) – RII = >0.3 - <=0.8 (Mid to Upper Slope Roads) Or RII = < 0.1 (Lower Slope Roads)
	LOW (2pts) – RII = 0.1 - <=0.3 (Mid to Upper Slope Roads)
	VERY LOW (1pts) – RII <0.1 (Mid to Upper Slope Roads)
Individual Risk Rating: Potential Sediment Delivery from Distance of Road Fill to Channel	
Information Needs: Distance of road to intermittent and perennial stream channels	**VERY HIGH (5pts)** – more than 100 feet of the road segment is within 75 feet of stream channels
	HIGH (4pts) – more than 100 feet of the road segment is within 76-150 feet of stream channels
	MODERATE (3pts) – more than 100 feet of the road segment is within 151-225 feet of stream channels
	LOW (2pts) – more than 100 feet of the road segment is within 226-300 feet of stream channels
	VERY LOW (1pts) – less than 100 feet of the road segment is within 300 feet of stream channels
Individual Risk Rating: Slope or Road Surface	
Information Needs: Slope of road surface	**VERY HIGH (5pts)** – >=7%
	HIGH (4pts) – 5 - <7%
	MODERATE (3pts) – 3 - <5%
	LOW (2pts) – 2 - <3%
	VERY LOW (1pts) – <2%

Table 11. Risk rating for water quality impaired streams (primarily stream temperature)

Risk: Overall Risk Rating of Potential Impact of Roads to Water Quality-impaired Streams (primarily stream temperature)	
Information Needs: Distance of road to water quality impaired stream (303d steam segments & contributing perennial tributaries).	**VERY HIGH (5pts)** – more than 100 feet of the road segment is within 75 feet of water quality impaired stream
	HIGH (4pts) – more than 100 feet of the road segment is within 76-150 feet of impaired stream
	MODERATE (3pts) – more than 100 feet of the road segment is within 151-225 feet of impaired stream
	LOW (2pts) – more than 100 feet of the road segment is within 226-300 feet of impaired stream
	VERY LOW (1pts) – less than 100 feet of the road segment is within 300 feet of impaired stream

Table 12. Overall subwatershed risk rating from Forest Roads Analysis

Risk: Overall Subwatershed Risk Rating from the 2005 Malheur National Forest Roads Analysis	
Information Needs: Overall subwatershed risk rating from the 2004 Malheur NF roads analysis was used to identify subwatershed risk. Roads were assigned risk ratings based upon the risk rating of the subwatershed from the 2004 analysis.	**VERY HIGH (5pts)** – Road segments within subwatersheds rated as Extreme Risk
	HIGH (4pts) – Road segments within subwatersheds rated as High Risk
	MODERATE (3pts) – Road segments within subwatersheds rated as Moderate Risk
	LOW (2pts) – Road segments within subwatersheds rated as Low Risk
	VERY LOW (1pts) – No or minimal roads in Subwatershed

Table 13. Example overall subwatershed risk assessment

Road Number	Sediment Delivery Risk	Water Quality Risk	Overall Subwatershed Risk
0000000	High	Moderate	High
0000012	Low	Low	Moderate
0000024	Very High	Very High	Very High

Special Areas

Table 14. Risk rating for special areas

Risk Rating for Special Areas	
Special areas and the resources within them can be impacted to varying degrees by the presence of roads. The degree of impact would depend on the nature of the area and the management standards of each specific type of designated special area. (For example, the presence or use of a road in a roadless or wilderness area poses a greater risk to those resources than a road in a research natural area where management direction allows for roads.) The Forest Plan provides direction for a variety of specifically designated management areas, each type with its own direction and standards. These include: Wilderness areas Scenic Areas Research Natural Areas (MA 9) Wild and Scenic Rivers (MA 22) Inventoried roadless areas (IRAs) and potential wilderness areas (PWAs) are listed in Appendix J and K of the Forest Plan with allocation direction provided in the semi-primitive non-motorized (MA 10) and semi-primitive motorized (MA 11) recreation area sections. IRA and PWA boundaries often do not directly coincide with the MA boundaries, so the IRA and PWA shape files in the Forest database were used for this analysis. **Data Source:** Malheur Forest Plan Ochoco Forest Plan	**5 (HIGH)** – High risk roads are roads that are not permitted or not compatible with the resource values that the specific areas are designed to protect. These include roads in congressionally designated wilderness areas (MA 6), segments of wild and scenic rivers designated "wild" (MA 22), scenic areas (MA 7) and potential wilderness areas (PWAs). **4 (MOD-HIGH)** – Moderately high risk roads are roads that may not be compatible with the resource values that the specific areas are designed to protect. These include segments of wild and scenic rivers designated "scenic" (MA 22) and inventoried roadless areas (IRAs) that are truly roadless and/or have a recreation opportunity spectrum (ROS) designation of semi-primitive non-motorized (MA 10). **3 (MODERATE)** – Moderate risk roads are roads that may not be appropriate considering the resource values that the specific areas are designed to protect. These include inventoried roadless areas (IRAs) where some roads may be present and/or that have a recreation opportunity spectrum (ROS) designation of semi-primitive motorized (MA 11). **2 (LOW-MOD)** – Moderately low risk roads are roads that may or may not be appropriate depending on the resource values and management objectives for the specific areas. These include research natural areas (MA 9). **1 (LOW)** – Low risk roads are roads not located within any special area.

Recreation

Table 15. Benefits of road access for recreation

Benefit Rating of Roads for Access to Recreation	
Roads provide access for many forms of recreation, including but not limited to: driving for pleasure, snowmobiling, ATV riding, sightseeing, camping, hiking, biking, cross-country skiing, hunting, fishing, wildlife watching, firewood cutting, etc. Roads often provide direct access to recreation sites such as campgrounds, trails, picnic areas, dispersed campsites and various points of interest. Driving for pleasure is the highest-rated recreation opportunity on the Forest. Recreational uses of forest roads and the recreation opportunities they provide access to vary widely. **Units of Measure**: Professional judgment on direct, indirect, and alternate access routes **Data Source:** Recreation GIS data Special interest area GIS data	**5 (HIGH)** – High benefit roads are roads that provide direct access to developed recreation sites (MA 12) or special interest areas (MA 8) and/or roads used as snowmobile trails or designated bicycle routes. **4 (MOD-HIGH)** – Moderately high benefit roads are roads that provide direct access to disperse recreation sites, points of interest, or named locations. **3 (MODERATE)** – Moderate benefit roads are roads that provide indirect/alternate access to recreation sites or provide a circuitous loop for recreational driving. **2 (LOW-MOD)** – Moderately low benefit roads are roads where there is no access to point of interest or named location. All roads are considered to have some benefit to recreation.

Scenic Viewing

Table 16. Benefit of road access to scenic viewing

Benefit Rating of Roads for Access to Scenic Viewing	
Roads provide access to areas and vistas in the Forest that are valued for their scenic attractiveness. They serve as viewing corridors from which scenery can be viewed and appreciated. Scenic corridors (MA 14) are identified in the Forest Plan. Management direction and standards are based on the viewing area (foreground or middleground from the core of the scenic corridor) and sensitivity level of the scenery to the viewing public. For the purpose of this analysis, it is assumed that the view from a road located within any specific viewing distance area would be similar to that of the scenic corridor itself. If a road crosses between two different classifications, the higher rating is assigned. **Units of Measure**: Intersection of roads with foreground and middleground areas associated with visual corridors **Data Source:** Visual Corridor GIS data	**5 (HIGH)** – High benefit roads are roads located in foreground areas of sensitivity level 1 visual corridors **4 (MOD-HIGH)** – Moderately high benefit roads are roads located in foreground areas of sensitivity level 2 visual corridors. **3 (MODERATE)** – Moderate benefit roads are roads located in middleground areas of sensitivity 1 visual corridors. **2 (LOW-MOD)** – Moderately low benefit roads are roads located in middleground areas of sensitivity level 2 visual corridors. **1 (LOW)** – Low benefit roads are roads not located within the view area of a visual corridor.

Forest Vegetation Management

Table 17. Benefit of road access to forest vegetation management

Transportation System Roads Provide Access for Forest Vegetation Management for Future Project Planning and Current Project Implementation Activities	
Question to be addressed? How important is it for the road to be open and usable for current or near future planning or implementation activities? **Units of Measure:** Potential need for road access. **Data Source:** 2014 NAIP Transportation Spatial and Tabular Data Malheur NF Acceleration Restoration Priority Watershed map.	**5 (HIGH)** – The road provides a high benefit because it is needed or probably will be needed for: (1) current project planning (including data collection) activities, and (2) ongoing project implementation efforts from completed planned projects.
	4 (MOD-HIGH) – The road provides potentially moderate to high benefit because: (1) the area is scheduled for project planning within 5 years and data collection efforts have started or will soon start, and (2) site-specific analysis of the benefit will soon be done.
	3 (MODERATE) – The road provides potentially moderate benefit because: (1) area is scheduled for project planning 5-9 years into the future but no current planning or implementation activities, (2) area is not currently scheduled for planning within 10 years but accesses forested area for which there will potentially be planning and implementation activities within 20 years.
	2 (LOW-MOD) – The road provides potentially low to moderate benefit for forest vegetation management because: (1) road directly or indirectly accesses forested area that will need little vehicle access for many years (20+) due to events such as large wildfires, (2) road accesses little forested land which due to management direction will be intensively and actively managed.
	1 (LOW) – The road potentially low benefit for forest vegetation management because: (1) road does not provide direct access to manageable forested land, (2) road does not provide an indirect route to roads that provide direct access to manageable forest land, or (3) road access forested land that through management direction will probably not be actively managed.

Malheur National Forest Wildlife and Associated Habitats

Table 18. Risk impacts of road access on wildlife habitats

Risk: Road Access Could Restrict Wildlife Use of Important Seasonal Habitats	
Does the road allow motorized access to areas used by wildlife during critical seasonal periods or rare/uncommon habitats? **Units of Measure**: Critical Winter Range Harney Basin Bald Eagle Winter Roosts (MA-5) **Data Source:** Harney Basin Bald Eagle winter roosts (MA-5) Critical winter range	**5 (HIGH)** – Road accesses critical winter range or Bald eagle winter roosts during the winter months.
	3 (MODERATE) – Road passes within .25 miles of critical winter range or Bald Eagle winter roosts during the winter months.
	1 (LOW) – Road accesses critical winter range or Bald eagle winter roosts outside of the winter months

Table 19. Risk impacts of road access on nest stand buffers and reproductive areas

Risk: Road Access Could Reduce Reproductive Success in Nest Stand Buffers or Other Reproductive Areas	
Does the road access nest stands or reproductive areas during the critical reproductive period? **Units of Measure**: Goshawk nest stands Bald and golden eagle nest sites **Data Source:** Goshawk nest stands Bald and golden eagle nest sites	**5 (HIGH)** – Road provides motorized access within nest stand buffers or reproductive areas during the critical breeding period.
	3 (MODERATE) – Road passes within .25 miles of a nest stand buffer or reproductive area during the critical breeding period.
	1 (LOW) – Road provides motorized access within nest stand buffers or reproductive areas outside of the critical breeding period.

Table 20. Risk impacts of road access to riparian habitat conservation areas

Risk: Road Access May Degrade Habitats within Riparian Habitat Conservation Areas (RHCAs)	
Does the Road Access RHCAs? Approx. 75% of terrestrial wildlife species found in the Blue Mtns. are either directly dependent on Riparian habitats or utilize them more than other habitats (Thomas et. al. 1979). **Units of Measure**: No. of roads accessing RHCAs **Data Source:** RHCAs	**5 (HIGH)** – Road passes through an RHCA.
	3 (MODERATE) – Road passes within 100 m of an RHCA
	1 (LOW) – Road does not pass through an RHCA.

Table 21. Risk impacts of road access to greater sage grouse available habitat

Risk: Road Access May Discourage Greater Sage Grouse Use of Available Habitat	
Location of road in relation to threatened, endangered, sensitive or candidate species? **Units of Measure**: Open roads within designated greater sage grouse habitat. **Data Source:** Malheur greater sage grouse areas	**5 (HIGH)** – Road accesses designated greater sage grouse habitat core areas
	3 (MODERATE) - Road accesses designated greater sage grouse habitat low density areas
	1 (LOW) – Road does not access designated greater sage grouse habitats.

Table 22. Risk impacts of road access on Priority habitats as identified in TRACS

Risk*: Road Access May Degrade Priority Habitats as identified in the Terrestrial Restoration and Conservation Strategy (TRACS)	
Does the road provide access to priority habitats identified in the TRACS analysis? **This could also be an access benefit if restoration activities are planned for a TRACS watershed.* **Units of Measure:** Open roads within R6 TRACS priority habitat **Data Source:** R6 Terrestrial Restoration and Conservation Strategy	**5 (HIGH)** – Road passes through the Headwaters Silvies River (TRACS-26), Murderer's Creek (TRACS-50) or Upper North Fork Malheur River (TRACS-78)
	1 (LOW) – Road does not pass through any TRACS priority habitats.

High Quality Elk Feeding Habitat

Table 23. Risk impacts of road access to high quality elk feeding areas

Risk: Road Access into High Quality Elk Feeding Areas Will Discourage the Use of These Areas by Elk	
Does the disturbance from use of the road restrict elk use of high quality feeding areas as delineated by the elk habitat model? **Units of Measure**: Road access into high quality feeding areas **Data Source:** Blue Mtns. Elk habitat model	**5 (HIGH)** – Road use will discourage elk from using high quality feeding areas
	3 (MODERATE) - Road use will discourage elk from using low quality feeding areas
	1 (LOW) – Road use does not discourage elk from using high quality feeding areas

Snags and Down Wood

Table 24. Risk impacts of road access to the reduction of snags and down logs

Risk: Road Access Contributes to the Reduction of Snags and Down Logs	
Does the road contribute to the reduction of habitat for species dependent upon snags and down logs? **Units of Measure**: Road accesses areas that are conducive to off-road motorized travel **Data Source:** Road topography analysis (GIS)	**5 (HIGH)** – Road provides access to forest types and topography that are conducive to off-road travel and firewood removal.
	3 (MODERATE) – Road is in forest types and topography that allow moderate off-road travel access and moderate potential to drop snag levels below desired levels
	1 (LOW) – Road segment has steep topography and limited off-road travel potential to have minimal impact on snags and down wood.

Range

Table 25. Benefit of road access to range improvements

Benefit: Road access to Range Improvements	
Motorized access to grazing allotments using roads benefits the Forest Service by facilitating the administration of grazing permits and benefits grazing permittees by providing access to maintain structural range improvements (corrals, water developments, fencing, etc.). **Units of Measure**: Road accesses areas that are conducive to off-road motorized travel **Data Source:** Road topography analysis (GIS)	**5 (HIGH)** – High benefit roads are those roads that lead directly to or within ¼ mile of rangeland structural improvements.
	3 (MODERATE) – Medium benefit roads are those roads that are located between ¼ mile and ½ mile of rangeland structural improvements.
	1 (LOW) – Low benefit roads are those roads that are located more than ½ mile from rangeland structural improvements.

Lands Special Uses

Table 26. Benefit of road access to special uses

Benefit: road access to special uses	
Roads provide authorized users and administrative staff access to special use areas. **Units of Measure**: Yes No **Data Source:** T:\FS\Reference\GIS\r06_mal\LayerFile\Land\MiningClaims.lyr T:\FS\NFS\Malheur\program\SpecialUses-2700\GIS\Data\spuse.gdb	**5 (HIGH)** - High benefit roads access special use areas directly or close proximity (within ¼ mile).
	1 (LOW) - Low benefit roads do not access special use areas directly or close proximity (within ¼ mile).

Minerals

Table 27. Benefit of road access to mining claims

Benefit: Road access to mining claims	
Roads provide authorized users and administrative staff access to mine claims. **Units of Measure**: Yes No **Data Source:** T:\FS\Reference\GIS\r06_mal\LayerFile\Land\MiningClaims.lyr T:\FS\NFS\Malheur\program\SpecialUses-2700\GIS\Data\spuse.gdb	**5 (HIGH)** - High benefit roads access mining claim directly, or close proximity (within ¼ mile).
	1 (LOW) - Low benefit roads do not access mine claims directly or close proximity (within ¼ mile).

Engineering

Table 28. Benefit of road access to off-forest areas

Benefit: Road Access to Off-forest Areas	
A large investment has been placed into roads. This assessment recognizes the investment as a benefit. **Units of Measure**: MILES **Data Source:** INFRA	**5 (HIGH)** - These are roads where off forest access is needed or are part of the Primary Open Road System from the RAP.
	4 (MOD-HIGH) - These are roads with an aggregate surface
	3 (MODERATE) - These are roads with an improved surface
	2 (LOW-MOD) – These are native surface arterial, collector roads and roads with an objective maintenance level of 2
	1 (LOW) – all other roads

A compilation of all risks and benefit ratings is included in the roads analysis list table included in Appendix A.

Step 5: Describing Opportunities and Priorities

Purpose

The purpose of this step is to:

- Provide an economic analysis
- Develop a preliminary opportunity matrix that will be used to combine the results from Step 4
- Include a priority rating for addressing risk and benefits.

The following economic analysis shows the (1) costs of maintaining the existing road system, and (2) the costs which would be incurred if the emphasis were placed on maintaining the primary open-road system only. With an emphasis on the primary open-road system, minimal custodial work would still be performed on the remaining road in the system to provide safety and resource protection. The annual road maintenance costs lowers from $2,176,775 to $767,150 when the emphasis is placed just on the primary open-road system.

The following economic analysis provides information on the existing road system, as well as, the primary open-road system as recommended in the 2005 roads analysis process. This economic analysis provides a broad assessment of the entire transportation system for consideration in future travel management decision making. This assessment is general and at the forest scale, and will be used to develop proposed changes and inform more local decisions.

Financial Analysis

Introduction

Part of the Travel Management Regulations, at 36 CFR 212.5(b)(1), requires each National Forest to identify the minimum road system that is needed to:

1. Meet resource and other management objectives adopted in the relevant land and resource management plan;
2. Meet applicable statutory and regulatory requirements;
3. Reflect long-term funding expectations;
4. Ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

The purpose of the financial analysis section of this report is to address item number 3 above, and identify opportunities for how the road system could be managed in the future to better reflect long-term funding expectations. This information will be used by the responsible official, along with other information regarding the risks and benefits of the road system, to strike the best balance between the four items above. The official decision and "identification" of what will constitute that future road system will be made following subsequent NEPA analyses at various scales.

Background

Forest Service road budgets have been steadily declining for the past 20 plus years. Region-wide, the amount of funding for road work including both appropriated funding and work contributed by commercial users is less than 20 percent of what it was 20 years ago. Appropriated road funds to the Pacific Northwest Region (Region 6) have been reduced 40 percent from 2009 to 2015 and have

remained fairly steady since then. Current levels of funding for road work on the Malheur National Forest are shown in figure 1 below.

Table 29. Three-year average road funding

Fund	2008 ($1K)	2009 ($1K)	2010 ($1K)	2011 ($1K)	2012 ($1K)	2013 ($1K)	2014 ($1K)	2015 ($1K)	Percent to Forest Rd Mtc Program	Last 3-year average to Rd Mtc Program ($1K)
CMRD (*Capital Improvement & Maintenance – Roads*)	1,247	1,143	1,089	844	581	583	676	611	100%	623
CMLG (*Legacy Roads*)	211	490	665	213	107	228	177	160	8%	15
CWF2 (*Cooperative Work Collections*)	500	153	150	100	150	63	150	68	100%	94
CWK2 (*Cooperative Work, Knutson-Vandenberg*)	0	0	0	0	0	940	0	0	0%	0
Purchaser Maintenance	Not avail.	Not avail.	Not avail.	Not avail.	Not avail.	34	34	34	100%	34
									Total	**$766**

With funds being far below what is necessary to keep the road system properly maintained, many roads do not get the maintenance treatments they need on schedule and are falling into a severe state of disrepair. Maintenance is focused on passenger car clearance (Level III and IV) roads.

> **Deferred Maintenance** is defined as "maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value", (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998).
>
> **Annual Maintenance** is defined as "work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur" (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998).

Since 1999, the Forest Service has been tracking the amount of the deferred maintenance backlog. Table 30 shows what the accumulated totals are for deferred maintenance (DM) and the annual maintenance (AM) needs that would be required to keep the road system fully maintained to standard.

Table 30. R6 annual and deferred maintenance needs

National Forest	Road Miles	Total Maintenance Need	
		Deferred Maintenance	Annual Maintenance
Deschutes	8,109	$80,566,681	$7,526,877
Fremont-Winema	12,548	$133,971,908	$13,642,507
Gifford Pinchot	4,103	$53,330,891	$5,312,486
Malheur	9,628	$56,025,932	$6,153,833
Mt. Baker-Snoqualmie	2,453	$81,915,920	$9,660,568
Mount Hood	2,881	$51,813,990	$4,896,610
Ochoco	3,253	$33,260,537	$3,313,734
Olympic	2,026	$42,680,614	$4,467,995
Rogue River-Siskiyou	5,288	$111,614,953	$11,581,995
Siuslaw	2,128	$26,115,387	$2,777,636
Umatilla	4,624	$65,211,612	$6,647,168
Umpqua	4,776	$73,669,140	$7,148,103
Wallowa-Whitman	9,150	$64,279,905	$6,808,709
Okanogan-Wenatchee	8,163	$158,111,026	$17,050,400
Willamette	6,542	$90,942,456	$8,838,067
Colville	4,309	$37,336,065	$4,306,765
Columbia River Gorge	99	$1,454,584	$121,557
	90,078	$1,162,301,600	$120,255,010

This chart shows that it would take approximately $1.2 billion dollars to bring the entire road system in Region 6 back up to standard (all roads in a like new condition), and then it would take approximately $120 million dollars per year to keep all roads perfectly maintained to standard. For the Malheur NF, it would take approximately $56 million to bring their entire road system back up to standard, and about $6.2 million per year to keep it that way. Please note that the unit costs used to arrive at the figures above are made up of national averages to restore and maintain the road system in a like new condition. They also include the cyclical items necessary to replace gravel surfacing, pavement overlays, bridges/structures, and major culverts on schedule.

Using Regional unit costs, and without the national burden rate, a more conservative estimate for annual maintenance needs to keep the existing Malheur National Forest road system fully maintained to standard would be about $2.2 million dollars per year. Figure 1 shows that, on average, the Malheur receives about $766 thousand dollars in appropriated funds per year that can be applied toward road maintenance work that is about 35 percent of the funding necessary to address the estimated annual maintenance needs to fully maintain the road system.

Financial Analysis Process

The goal of the financial analysis step in the overall travel analysis process is to identify opportunities to help move the road system to a more affordable state.

The following tables show the two scenarios of (1) maintaining the existing road system, and (2) the emphasis placed on maintaining the primary open-road system only.

Table 31. Economic analysis of the total existing road system

Existing System

Existing	Miles	Blading and Ditch Cleaning Cost per mile (5 year cycle)	Blading and Ditch Cleaning Cost per mile/Year (annual)	Blading and Ditch Cleaning Total Cost (annual)	Brushing Cost per mile (4 year cycle)	Brushing Cost per mile/year (Annual)	Brushing Total Cost (annual)	Signs Cost per mile (10 year cycle)	Signs Cost per mile (annual)	Signs Total Cost (annual)	Spot rocking Cost per mile/year (Annual)	Spot Rock Total Cost (annual)	Patching Cost per mile/year (Annual)	Patching Total Cost (annual)	Chip Sealing Cost per mile (11 year cycle)	Chip Sealing Cost per mile/year (annual)	Chip Sealing Total Cost (annual)
ML 1	3,840	$0	$0	$0	$0	$0	$0	$30	$3	$11,520	$0	$0	$0	$0	$0	$0	$0
ML2 - Not ditched	2,687	$100	$20	$53,740	$260	$60	$161,220	$100	$10	$26,870	$10	$26,870	$0	$0	$0	$0	$0
ML2 - Ditched	2,687	$500	$100	$268,700	$260	$60	$161,220	$100	$10	$26,870	$10	$26,870	$0	$0	$0	$0	$0
ML3 - Aggregate	155	$3,500	$500	$77,500	$260	$60	$9,300	$200	$20	$3,100	$20	$3,100	$0	$0	$0	$0	$0
ML4 - Bituminous	105	$1,250	$250	$26,250	$260	$60	$6,300	$200	$20	$2,100	$0	$0	$100	$10,500	$50,000	$4,545	$477,225
ML4 - Asphalt	100	$1,250	$250	$25,000	$260	$60	$6,000	$200	$20	$2,000	$0	$0	$100	$10,000	$50,000	$4,545	$454,500
Total Miles	9,574																
Sub Total Annual Cost				$451,190			$344,040			$72,460		$56,840		$20,500			$931,725
Overhead (annual)	$300,000																
Grand total Annual Cost	**$2,176,755**																

Table 32. Economic analysis of the minimum primary open road system recommended in the roads analysis process

Roads Addressed to Emphasize Primary Open Road System

Excludes thse from Analysis

Existing	Miles	Blading and Ditch Cleaning Cost per mile (5 year cycle)	Blading and Ditch Cleaning Cost per mile/Year (annual)	Blading and Ditch Cleaning Total Cost (annual)	Brushing Cost per mile (4 year cycle)	Brushing Cost per mile/year (Annual)	Brushing Total Cost (annual)	Signs Cost per mile (10 year cycle)	Signs Cost per mile (annual)	Signs Total Cost (annual)	Spot rocking Cost per mile/year (Annual)	Spot Rock Total Cost (annual)	Patching Cost per mile/year (Annual)	Patching Total Cost (annual)	Chip Sealing Cost per mile (11 year cycle)	Chip Sealing Cost per mile/year (annual)	Chip Sealing Total Cost (annual)
ML 1	3,751	$0	$0	$0	$0	$0	$0	$30	$3	$11,253	$0	$0	$0	$0	$0	$0	$0
ML 2 (not part of Primary Open Road System)	3,675	$0	$0	$0	$0	$0	$0	$100	$10	$36,750	$0	$0	$0	$0	$0	$0	$0
ML2 - Not ditched	849	$100	$20	$16,980	$260	$60	$50,940	$100	$10	$8,490	$10	$8,490	$0	$0	$0	$0	$0
ML2 - Ditched	849	$500	$100	$84,900	$260	$60	$50,940	$100	$10	$8,490	$10	$8,490	$0	$0	$0	$0	$0
ML3 - Aggregate	155	$3,500	$500	$77,500	$260	$60	$9,300	$200	$20	$3,100	$20	$3,100	$0	$0	$0	$0	$0
ML4 - Bituminous	105	$1,250	$250	$26,250	$260	$60	$6,300	$200	$20	$2,100	$0	$0	$100	$10,500	$0	$0	$0
ML4 - Asphalt	100	$1,250	$250	$25,000	$260	$60	$6,000	$200	$20	$2,000	$0	$0	$100	$10,000	$0	$0	$0
Total Miles	9,484																
Sub Total Annual Cost				$230,630			$123,480			$72,183		$20,080		$20,500			$0
Overhead (Annual)	$300,000																
Grand total Annual Cost	**$766,873**																

The tables above show that by using the Malheur National Forest's current road maintenance costs for routine annual maintenance items, (which does not include things like replacing gravel surfacing, replacing pavements, or replacing bridges and structures), the current cost of keeping up the existing road system would be about $1.3 million dollars per year. By making some adjustments to the current road system in terms of reducing the total miles of roads on the system (emphasizing the primary open-road system), minimizing maintenance on other roads that are not part of the primary open-road system, and changing the maintenance intensities on other roads, the overall cost can be reduced to somewhere around $767 thousand dollars per year. This amount is very close to the range of the 3-year average annual amount available as shown in Table 29.

Capital Investments

The section above only considers road maintenance needs and costs, but there are also costs associated with any proposed road decommissioning, road closures, and road improvements necessary to address risks and environmental concerns that are identified in the travel analysis report. These costs are not included in the balancing of road maintenance funds because funding for these activities is not appropriated along with the normal road maintenance funds used in the calculations. Funding for this type of work generally comes though other programs such as capital investment programs, Legacy Roads and Trails funding, Federal Highway programs, and partnerships with outside groups and agencies. But the scale of the need for these types of funds certainly needs addressed here. The estimated costs from the example above are shown in Table 33.

Table 33. Estimated capital costs of improvement and decommissioning work

Category	Cost per Mile
Estimated Cost to put roads in storage	$9,000
Estimated Cost to decommission roads	$11,000
Estimated Cost for improvement work (HH, HM, MH, MM roads)	$5,000

Conclusions

The results of the Financial Analysis show that the opportunities identified provide for a primary open-road system, with minimal maintenance on remaining roads. The remaining roads that are not part of the primary open-road system would be maintained on a case-by-case basis at a project level, as needed. These would leverage funding from these projects for activities that need the road for use, such as, vegetation management treatments, range management, mining, special uses, or recreation activities.

Given the current trend in reduced funding for road maintenance work, and the enormous gap between current funding and need, it does not appear possible to identify a future road system where the entire cost of annual maintenance work necessary to fully maintain the roads to standard would be in balance with available funding, (to include annual maintenance items and cyclic capital costs for replacement of gravel surfacing, pavements, structures, bridges, etc.). In the Pacific Northwest Region, the size of road system to meet that requirement would be less than 100 miles per national forest and would not allow the Forest Service to meet resource management objectives in forest plans or to meet statutory and regulatory requirements. Because we will not have enough funding available to keep all road surfacing materials and structures replaced on schedule, we can expect the deferred maintenance backlog to continue to grow, and we will continue to see a decline in the overall serviceability of our road system.

However, even though we can't alter the road system so much as to be fully affordable and sustainable within today's budget levels, we can certainly take steps to move it in better direction. By utilizing the opportunities identified from the Malheur travel analysis process, we can certainly move the Malheur National Forest road system to a much more affordable and sustainable state.

Recommendations

By utilizing the priorities identified in Step 5 of the travel analysis report, the staff of the Malheur National Forest can focus limited road maintenance resources, and any potential capital funds, to the most important roads necessary for management and enjoyment of the national forest, and to the roads with the highest need for mitigation work associated with environmental risks. The Malheur staff should consider the following:

- Focus available maintenance funding and resources on the primary open-road system.
- Focus any available capital funds toward improvement work on high use roads with high environmental risks identified in the travel analysis report.
- Continue to prioritize signing safety on all roads, including roads that are not part of the primary open-road system.
- Continue to prioritize resource protection on all roads, including roads that are not part of the primary open-road system.
- Prioritize funding for roads to be closed or decommissioned based on those with the highest environmental risks identified in the travel analysis report.
- Ensure that commercial users perform, or deposit funds, for road maintenance work commensurate with their use.
- Seek additional funding for road maintenance through regular appropriations.
- Seek new and additional funding sources for road maintenance and improvements through any available funding programs such as Capital Investment Programs, Legacy Roads and Trails, Forest Highway Programs, etc.
- Seek partnership opportunities to help leverage funds with outside sources
- Seek opportunities to transfer jurisdiction of National Forest System roads to other agencies
- Continue to look for ways to reduce maintenance costs, and overhead costs related to Forest Service road programs, so as to direct more funds directly to road maintenance and improvement work.

Continue to prioritize safety on all roads, including roads that are not part of the primary open-road system.

Opportunity Matrix That Will be used to Combine the Results from Step 4

The following preliminary opportunity matrices were developed to combine the risks and benefits from Step 4 into opportunities for change. Two matrices were developed, one for Operational Maintenance Level 1 roads and one for Operational Maintenance Level 2 roads.

The matrices document the individual risks and benefit categories (high, medium, low), as well as the overall combined categories (high-low, high-medium, etc.).

Opportunities with yellow highlights are considered a high priority for addressing during subsequent site-specific travel planning. Blue highlights are considered a medium priority, and those without color are considered a low priority.

The pages following the decision matrices provide a visual display of roads by risk and benefit. Blue bubbles represent roads with at least one high value of "5", and brown represent the others. This visual tool was used to lump roads into various categories (i.e., HL, HH, etc.). The diagram shows the road which stands out at the extreme and which present the highest opportunities.

		Malheur Operational ML 1: 4,122 Roads; 2,406 Miles		
		BENEFITS (8-40)		
		Low 9-14 1,167 roads 549 mi.	Medium 15-18 2,470 roads 1,458 mi.	High 19-28 485 roads 401 mi.
RISKS (16-80)	High 42-59 806 roads 780 mi.	benefit HL 185 roads 142 mi risk	benefit HM 458 roads 439 mi risk	benefit HH 181 roads 213 mi risk
	Medium 30-41 2,643 roads 1,415 mi.	benefit ML 801 roads 353 mi risk	benefit MM 1,569 roads 873 mi risk	benefit MH 280 roads 185 mi risk
	Low 20-29 674 roads 212 mi.	benefit LL 180 roads 53 mi risk	benefit LM 435 roads 137 mi risk	benefit LH 33 roads 11 mi risk

Figure 1. Maintenance level 1 roads on the Malheur National Forest risk and benefit results

Malheur Operational ML 2: 3,646 Roads; 2,813 Miles				
		BENEFITS (8-40)		
		Low 9-14 665 roads 310 mi.	Medium 15-20 2,643 roads 2,140 mi.	High 21-34 338 roads 364 mi.
RISKS (16-80)	High 43-61 786 roads 1070 mi.	benefit HL 93 roads 74 mi risk	benefit HM 549 roads 758 mi risk	benefit HH 157 roads 247 mi risk
	Medium 30-42 2,330 roads 1,555 mi.	benefit ML 465 roads 206 mi risk	benefit MM 1,711 roads 1,230 mi risk	benefit MH 157 roads 109 mi risk
	Low 20-29 533 roads 199 mi.	benefit LL 107 roads 29 mi risk	benefit LM 381 roads 149 mi risk	benefit LH 26 roads 11 mi risk

Figure 2. Maintenance level 2 roads on the Malheur National Forest risk and benefit results

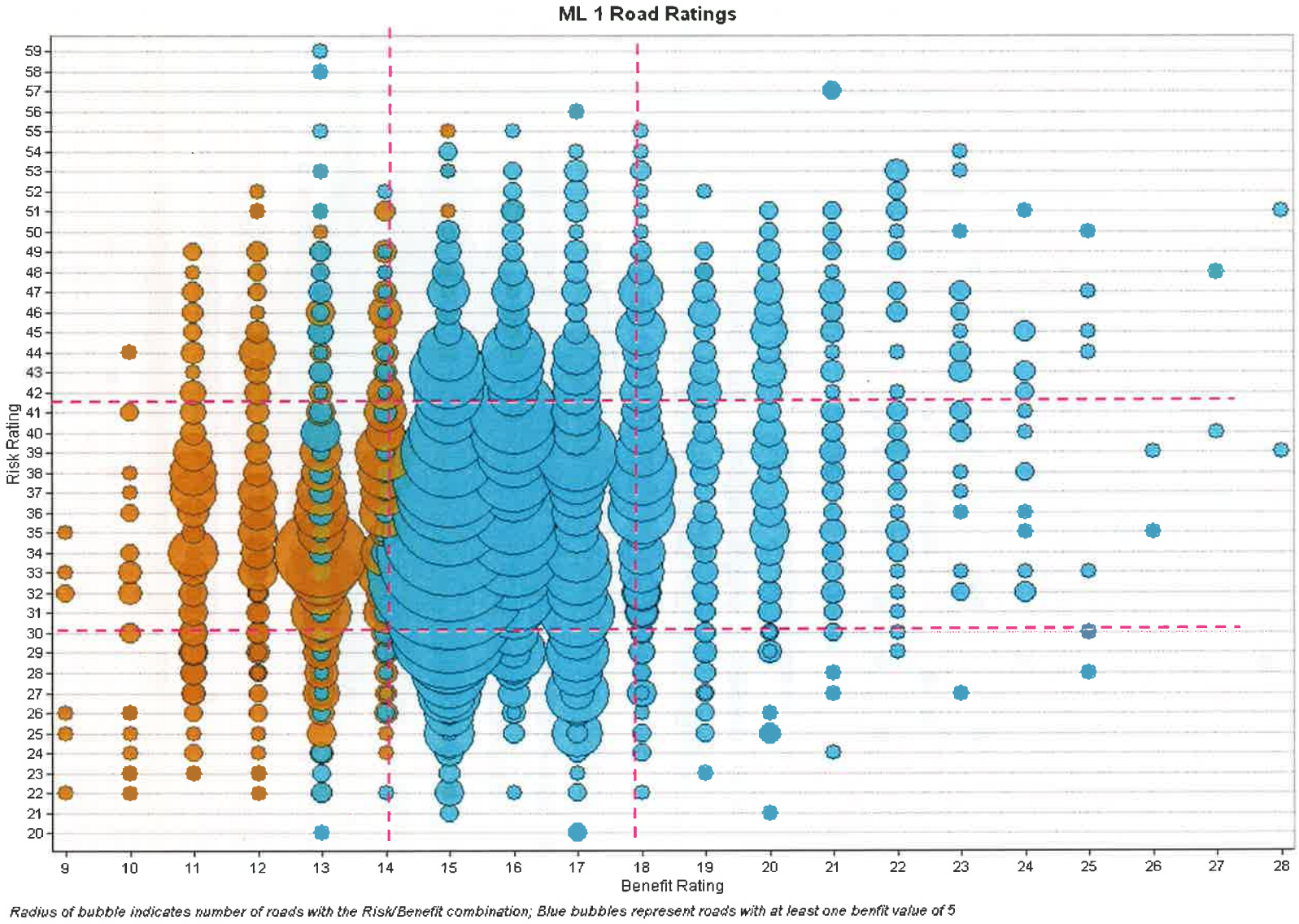

Figure 3. Maintenance level 1 risk and benefit rating

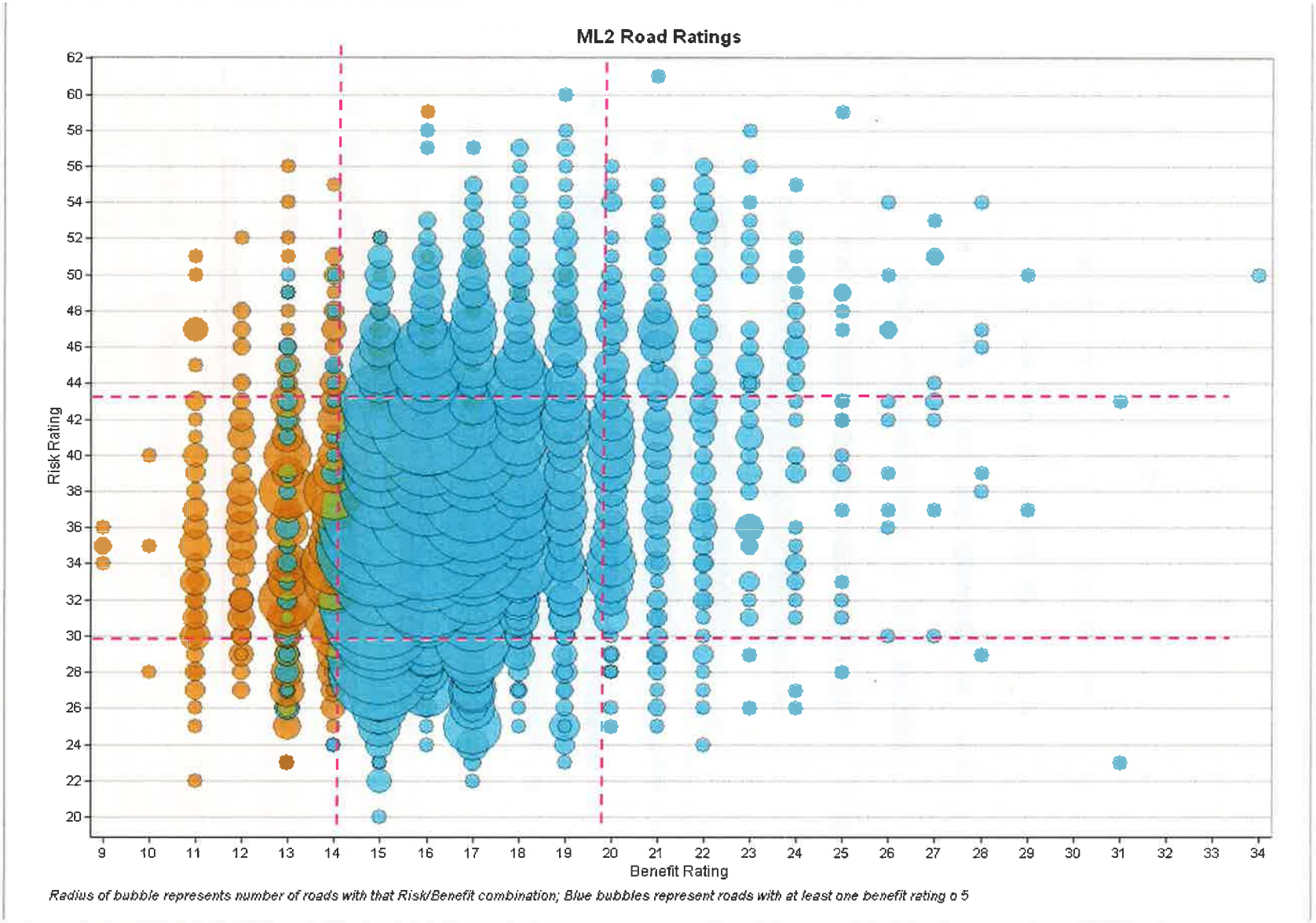

Figure 4. Maintenance level 2 risk and benefit rating

Priority Rating for Addressing Risk and Benefits within the Matrix

Future Options

Step 4 of this travel analysis report identifies a ranking of risk and benefits. The following table is a narrative discussion of the rating, along with potential future management opportunities for each. Any future management decision should be informed by site-specific analysis to properly assess roads before pursuing or revising these opportunities.

Table 34. Discussion of the ratings

Rating (Risk: Benefit)	Description	Priority for Mitigation for Future Management	Potential Engineering Options based upon Analysis (Ties to Table 35)
HL	These high-risk roads have minimal benefits and could be considered for closure or removal from the Forest transportation system.	High Priority for Mitigation	Decommission Store Keep
HM	These high-risk roads have some documented benefits and could be considered for mitigation of the resource risk along with retention in the Forest transportation system to continue providing access.	Moderate Priority for Mitigation	Keep Store
HH	These high-risk roads have high documented benefits and could be considered for mitigation of the resource risk (i.e., reconstruction via realignment) along with retention in the Forest transportation system to continue providing important access.	Moderate Priority for Mitigation	Keep
ML	These moderate-risk roads have minimal benefits identified and could be considered for closure or removal from the Forest transportation system.	High Priority for Mitigation	Keep Store Decommission
MM	These moderate-risk roads have moderate benefits identified and could be considered for mitigation of resource risks.	Moderate Priority for Mitigation	Keep Store
MH	These moderate-risk roads have high documented benefits and could be considered for mitigation of the resource risk, along with retention in the Forest transportation system to continue providing important access.	Moderate Priority for Mitigation	Keep
LL	These low-risk roads have minimal benefits and could be considered for closure or removal from the Forest transportation system.	Low Priority for Mitigation	Keep Store Decommission
LM	These low-risk roads have moderate benefits identified and could be considered for mitigation of resource risks.	Low Priority for Mitigation	Keep
LH	These low-risk roads have high documented benefits and could be considered for retention in the Forest transportation system to continue providing important access.	Low Priority for Mitigation	Keep

Table 35. Potential engineering options for future management

Option	Description
Convert:	Recommend road segment be removed from Forest transportation system and converted to another use such as NFS trail.
Convert to Motorized Trail	Trails will be open to motorized vehicles as specified in the future NEPA route designation document.
Convert to Non-Motorized Trail	Trails may be open to pedestrian, equestrian, or bicycle traffic as identified in the future project NEPA document.
Decommission:	The stabilization and restoration of unneeded roads to a more natural state. The routes are then removed from the Forest transportation system.
Decommission – Natural	After a NEPA decision, the route will be allowed to "self-decommission" to a more natural state, there are no known drainage problems.
Decommission – with Drainage Work	After a NEPA decision, the route will be obliterated and drainage restored to a more natural function.
Keep – then Decommission Post-Project	The route is currently needed for a project in the planning or implementation stage, but likely will not be needed in the future. The NEPA document will define how and when the road is to be decommissioned as described above.
Store:	Roads placed in storage for a year. The period of storage must exceed 1 year. These roads are considered to be operational maintenance level 1 roads and are closed for motorized travel without written permission, except in case of emergencies.
Store	Roads recommended for or are already in "storage" as maintenance level one road.
Store – then Decommission Post-Project	Roads that should be put into storage as soon as possible for resource protection, then later used for a project in the planning or implementation stages, and likely will not be needed after the project. The NEPA document will define how and when the road is to be decommissioned.
Store – with Mitigation	After a NEPA decision, put the road into "storage" to be closed with remedies for drainage problems.
Keep:	Routes recommended as needed for long term management to remain as NFS roads. Available for public or administrative use.
Add to the system	Within an OHV concept area, there are several unauthorized routes which may be brought forward for NEPA analysis. They are included in this TAP to facilitate the NEPA proposal development process.
Keep – Increase Maintenance Level	Upgrade the route to a higher standard of service for safety, resource protection, or other reasons. This may or may not require NEPA.
Keep – Reconstruct (repair or relocate)	Keep the road, but remedy resource problems with the location, surface, or drainage.
Keep – Reduce Maintenance Level	Reduce the service level of the road. This may affect OHV designation and may require an engineering analysis and NEPA.
Keep – Restrict Use (administrative use only)	Road is for administrative use only. Public use is by written permission only. New administrative use designations will require NEPA.
Keep – Restrict Use (seasonal closure)	Road use is limited to prevent resource damage. NEPA is required for new seasonal closures.
Keep – Retain As is	Retain the road for public and administrative use.

Step 6: Reporting

Purpose

The purpose of this step is to report the key findings of the analysis.

Key Findings of the Analysis

Key Issues

The key issues for this travel analysis include:

Effects to:

- off-road motorized travel
- motorized access for dispersed camping and firewood gathering
- inventoried road-less areas, riparian areas, old growth, research natural areas and wild and scenic rivers from motorized access for dispersed camping

Impacts to:

- motorized game retrieval
- permitted actions
- access for people with disabilities and older Americans

Effects on:

- recreational opportunities
- water quality/fish habitat
- threatened, endangered and sensitive species
- other important species
- watershed and soils
- invasive plant species and noxious weeds
- socio and economics
- wilderness areas, potential wilderness areas, inventoried roadless areas, research natural areas, wild and scenic rivers and areas of undeveloped character
- traditional uses

Results & Priorities

A total of 2,119 roads received a high benefit or high risk, and were therefore assigned a high priority for addressing during subsequent site-specific planning. These high-priority roads totaled 2,189 miles.

A total of 5,362 roads involving 2,948 miles were categorized as a medium priority, having received moderate risk or moderate benefit ratings. Medium priority roads still represent important opportunities, though with a lower level of urgency compared to the high priorities.

Low priority roads included 287 roads with a total of 82 miles.

Appendix A includes a table with the resource risk and benefit evaluations for each road, along with the resulting opportunities.

Appendix B includes a map with the individual route opportunities.

Appendix C includes a map of needed and not needed roads.

Literature Cited

USDA Forest Service. 1999. Roads Analysis: Informing decisions about managing the National Forest Transportation System. Misc. Rep. FS-643. Washington, D.C.: U.S. Dept. of Agriculture Forest Service. 222 pp. Available online at: http://www.fs.fed.us/eng/road_mgt/DOCSroad-analysis.shtml (accessed June 30, 2015).

USDA Forest Service. 2005. Malheur National Forest Roads Analysis Process. Malheur NF, U.S. Dept. of Agriculture, Forest Service. 181 pp. Available online at: http://www.fs.usda.gov/projects/malheur/landmanagement/projects (accessed June 30, 2015).

USDA Forest Service. 2009. Forest Service Handbook 7709.55, Chapter 20 – Travel Analysis. Washington, D.C.: U.S. Dept. of Agriculture Forest Service. 11 pp. Available online at: http://www.fs.fed.us/dirindexhome/ (accessed June 30, 2015).